REMARKS

This amendment is responsive to the Office Action dated April 19, 2005. Applicants have cancelled claims 44-46, added new claims 79 and 80, and amended claims 39, 47, 51, 55, 57, 61, 65, 66, 74. Claims 39-43 and 47-80 are pending upon entry of this amendment.

Provisional Double Patenting Rejection

The Examiner provisionally rejected claim 39 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 50 and 51 of copending Application No. 10/036,602. Applicants note the provisional status of this rejection. Accordingly, Applicants will address this issue if and when the rejection is formally applied.

Claim Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 39-78 under 35 U.S.C. 102(e) as being anticipated by Dai et al. (USPN 6,658,016). Applicants respectfully traverse the rejection to the extent such rejection may be considered applicable to the amended claims. Dai et al. (Dai) fails to disclose each and every feature of the claimed invention, as required by 35 U.S.C. 102(e); and provides no teaching that would have suggested the desirability of modification to include such features.

Before addressing the specific claim rejections, Applicants would like to address generally some fundamental differences between the packet switching fabric described by Dai and Applicants' claimed invention.

In general, Dai describe a packet switching fabric in which a plurality of switching devices 12 are coupled in a ring fashion. The Dai switch fabric is properly viewed as a ring of switches. For example, FIG. 1 of Dai illustrates four distinct switching devices 12 coupled in a ring-like manner using an external data ring 18 and a control ring 24. The data ring 12 includes a plurality of data ring segments each coupling a corresponding adjacent pair of the devices together to ultimately form a ring.

In the Dai switch fabric, packets may propagate from switch to switch and ultimately may traverse the ring of switches. As can be seen by FIG. 1, to traverse the ring, a packet must be sequentially propagated by each of the switches. Each of switches 12 in the ring is a separate

switch having input and output (sink) ports, and further includes ring interface circuitry so that the switches may be interconnected to form an overall ring of switches. In the Office Action, the Examiner correctly recognized that each of switches 12 is a distinct switch.

In contrast, Applicants describe a crossbar switch in which the crossbar switch itself includes internal data rings for transferring packets directly between the input ports and the output (sink) ports of that same switch. For purposes of clarity, Applicants refer the Examiner to Figure 2 of the present application that illustrates exemplary internal architecture of Applicants' described switch. When properly viewed, the Dai switches that may be connected to form a "ring" is fundamentally different from the internal crossbar switch architecture described and claimed by the Applicant. Applicants have amended certain claims to clarify this difference. In view of this technical clarification, Applicants now address the specific requirements of Applicants' amended claims.

Claims 39-54

Applicants have amended claim 39 to require a set of data rings internal to the crossbar switch that couples the input ports to the sink ports to communicate the data packets from the input ports of the crossbar switch to the sink ports. Furthermore, amended claim 39 requires that at least one sink port in said set of sink ports snoops said set of data rings and accepts those data packets directed to the destinations identified by the first port address table.

As described above, Dai describes a system in which a plurality of switches have additional circuitry so that the switched can be connected to form an overall ring. Figures 2A and 2B of Dai describe two different embodiments of the individual switches deployed by the Dai system to form the ring. Dai makes clear that, in either embodiment, an individual switch 12 includes a data ring processing circuit 60 and a separate data ring output port 22 for sending and receiving packets to other switches along the data ring. Dai states that the "data is transferred via the data ring from source ones of the switching devices to corresponding destination ones of the switching devices."[1]

Thus, it is clear that Dai describes switches 12 that can be connected to form an overall ring. Internally, each switch 12 includes a source management unit coupled to a destination

[1] Dai at col. 9, ll. 2-4.

management unit to transfer data packets. Switches 12 do not utilize internal data rings to transfer packets within the switches themselves.

Thus, for at least these reasons, Dai fails to teach or suggest a crossbar switch having a set of internal data rings that couples the input ports to the sink ports to communicate the data packets from the input ports of the crossbar switch to the sink ports of that switch, as required by amended claim 39.

Moreover, Dai fails to teach or suggest a crossbar switch in which at least one sink port snoops said set of data rings and accepts those data packets directed to the destinations identified by the first port address table, as further required by amended claim 39. With respect to these elements, the Examiner quoted a portion of Dai at col. 23, ll. 35-47 which states "first destination mapping table portion for providing mapping between destination ID and corresponding destination ports." This portion of Dai, however, is describing a mapping table used for control and data messages between switches 12. Dai makes clear that the packet routing control unit 302 of the source managing unit 90 is responsible for reading packet header information and determining a destination switching device using the routing table when forwarding packets between switches.[2] The receiving switch 12 receives packets from other switches via a dedicated a data ring processing circuit 60. More specifically, a data ring receiving unit 202 of the receiving switch 12 forwards packets to data distribution control unit 240, which accepts packets destined for any of the output ports 112 of the switch.[3]

Thus, for at least these reasons, Dai fails to teach or suggest a crossbar switch in which each sink port snoops on an internal set of data rings. In Dai, the output ports do not handle receipt of packets at all and, therefore, cannot separately snoop or even access the data ring described by Dai. In contrast, this function is performed by the data ring receiving unit 202 and the data distribution control unit 240 for the entire switch. This further illustrates the fundamental difference between the internal crossbar architecture described and claimed by the Applicants and the ring of switches described by Dai.

With respect to claim 41, Dai fails to teach or suggest a second port address table in communication with a second sink port and adapted to store data identifying a second destination

[2] Dai at col. 14, ll. 12-36
[3] Dai at FIGS. 3A & 3B and related description.

as being supported by a second sink port in said set of sink ports. In contrast, Dai makes clear that the data distribution control unit 240 accepts packets destined for any of the output ports 112 of the switch.[4] Thus, the mapping table in Dai, and referred to by the Examiner, cannot be said to be in communication with the second sink port, as required by Applicants' claim 41.

Unlike Applicants' switch in which each sink port may communicate with a separate address table for determining which packets to accept for that particular sink port, the individual output ports of Dai do not and cannot access the mapping table.

With respect to claim 43, Dai et al. fails to teach or suggest a crossbar switch having a set of sink ports, wherein each sink port is adapted to concurrently receive a plurality of data packets having different destination addresses. Similarly, with respect to claim 51, Dai et al. fails to teach or suggest a sink port having a buffer that is adapted to concurrently receive multiple packets.

In rejecting claims 43 and 51, the Examiner cites Dai at col. 8, lines 55-61 that states "while the data stream is being received at the data ring input it is also simultaneously transmitted from the appropriate one of network output ports."

However, this portion of Dai describes a "cut-through" packet transfer process in which a data stream is received at an input port and preceding data of that stream (i.e., data that has been previously received) is simultaneously transmitted from one of the network ports. In other words, a switch 12 of the Dai system need not wait until all of the packets of a packet stream are received before starting to transmit the packet stream out an output port.

In contrast, Applicants' claim 43 requires a crossbar switch having a sink port that is adapted to concurrently receive multiple packets. Thus, claim 43 requires that the sink port itself (i.e., the switch's output port) be capable of concurrently receiving multiple packets for transmission. Similarly, Applicants' claim 51 requires a sink port (i.e., an output port) having a buffer that is adapted to concurrently receive multiple packets.

This is entirely different from the Dai switching device that is capable of transmitting data at an output port (sink port) while receiving data at the input port. Nowhere does Dai teach or suggest a crossbar switch having a sink port (output port) that is capable of receiving multiple packets concurrently for transmission, as claimed by the Applicant.

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[4] Dai at col. 14, ll. 12-36

With respect to amended claim 47, Dai fails to teach or suggest a switch having a plurality of internal data rings to concurrently transfer multiple data packets. In rejecting claim 47, the Examiner cites the "control ring" and the "data ring." However, as described in Dai, the control ring transfers control messages between the switches. Applicants have amended claim 47 to clarify that the multiple data rings concurrently transfer multiple data packets. Dai fails to teach or suggest these features.

Claims 55-64

Applicants have amended claim 55 to require a set of data rings <u>internal</u> to the cross-bar switch to communicate the data packets from said set of input ports to said set of sink ports.

With respect to amended claim 55, for at least the reasons set forth above, Dai fails to teach or suggest a set of data rings internal to the cross-bar switch to communicate the data packets from said set of input ports to said set of sink ports. The Dai system that utilizes switches capable of being connected to form an overall ring does not anticipate or suggest a set of data rings internal to a crossbar switch to communicate data packets from the input ports of that switch to the output ports.

Moreover, Dai fails to teach or suggest a set of port address tables in communication with said set of sink ports, wherein each port address table in said set of port address tables is adapted to identify a plurality of destinations supported by a sink port in said set of sink ports. As described above, Dai makes clear that the data distribution control unit 240 accepts packets destined for <u>any</u> of the output ports 112 of the switch.[5] Thus, the mapping table in Dai cannot be said to be in communication with a set of sink ports, as further required by Applicants' claim 55. The individual output ports of Dai do not and cannot access the mapping table; this function is centrally performed by the data distribution control unit 240 for the entire switch.

For at least these reasons, Dai fails to teach or suggest a set of port address tables in communication with said set of sink ports, wherein each port address table in said set of port address tables is adapted to identify a plurality of destinations supported by a sink port in said set of sink ports, as required by claim 55.

[5] Dai at col. 14, ll. 12-36

Similarly, Dai fails to teach or suggest a second port address table in communication with a second sink port and adapted to store data identifying a second destination as being supported by a second sink port in said set of sink ports, as required by claim 57. In contrast, Dai makes clear that the data distribution control unit 240 accepts packets destined for any of the output ports 112 of the switch.[6] Thus, the mapping table in Dai, and referred to by the Examiner, cannot be said to be in communication with the second sink port, as required by Applicants' claim 57.

With respect to claim 58, for the reasons explained above with respect to claim 39, Dai fails to teach or suggest a crossbar switch in which the sink ports snoops data packets on each data ring in said set of data rings. Not only do the switches of the Dai system fail to include internal data rings, but, the switches include a data ring receiving unit 202 and a data distribution control unit 240 designed to accept any packet from the external data ring that is destined for any of the output ports 112 of the switch.[7] In Dai, the output ports do not handle receipt of packets at all and, therefore, cannot separately snoop or even access the data ring described by Dai. In contrast, this function is performed by the data ring receiving unit 202 and the data distribution control unit 240 for the entire switch.

With respect to claim 60, the Examiner refers to portions of Dai that describe the packet buffer control unit 340 in rejections of Applicants' claim that requires a sink port having a ring interface to said set of data rings. Applicants respectfully point out that the packet buffer control unit 340 is associated with input ports 88 on FIG. 3A and, therefore, is unrelated to a sink port. Moreover, Applicants further point out that to the extent the Examiner meant to refer to output manager 244 of FIG 3A, the output manager handles receipt of packets for all of output ports 84. Thus Dai fails to describe a switch in which individual sink ports have ring interfaces to receive data from a set of data rings. This again illustrates some of the differences between the Dai system in which switches can be connected to form a ring and Applicants' switch that utilizes internal data rings within the switch itself.

With respect to claim 61, Dai et al. fails to teach or suggest a sink port having a buffer that is adapted to concurrently receive multiple packets. In rejecting claim 61 the Examiner cites

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[6] Dai at col. 14, ll. 12-36

[7] Dai at FIGS. 3A & 3B and related description.

Dai at col. 8, lines 55-61 that states "while the data stream is being received at the data ring input it is also simultaneously transmitted from the appropriate one of network output ports." As described above, this portion of Dai describes a "cut-through" packet transfer process in which a data stream is received at an input port and preceding data of that stream (i.e., data that has been previously received) is simultaneously transmitted from one of the network ports. Nowhere does Dai teach or suggest a crossbar switch having a sink port (output port) that is capable of receiving multiple packets concurrently for transmission, as claimed by the Applicant.

Claims 65-73

Applicants have amended claim 65 to require concurrently collecting data at a sink port for data packets accepted by the sink port, including the steps of: (1) said sink port collecting data for said first data packet, and (2) said sink port collecting data for said second data packet concurrently with collecting data for said first data packet.

As discussed above, Dai describes a "cut-through" packet transfer process in which a data stream is received at an input port and preceding data of that stream (i.e., data that has been previously received) is simultaneously transmitted from one of the network ports. In other words, a switch 12 of the Dai system need not wait until all of the packets of a packet stream are received before starting to transmit the packet stream out an output port.

In contrast, Applicants' amended claim 65 requires <u>concurrently</u> collecting data for data packets accepted by said sink port. This is entirely different from the Dai switching device that is capable of transmitting data at an output port (sink port) while receiving data at the input port. Nowhere does Dai teach or suggest a crossbar switch having a sink port (output port) that is capable of receiving multiple packets concurrently for transmission, as claimed by the Applicant.

With respect to claim 66, for reasons set forth above, Dai fails to teach or suggest a set of data rings internal to a switch and in communication with said set of sink ports. Dai's use of switches 12 capable of being connected to form an overall ring does not teach or suggest Applicants' claimed switch architecture that utilizes internal data rings.

Claims 74-78

Applicants have amended claim 74 to clarify that claim 74 is directed to a method of transferring data within a switch. Applicants have further amended claim 74 to require transferring data packets from a set of input ports of a switch to a set of data rings internal to the switch and in communication with a set of sink ports of that particular switch.

For at least the reasons set forth above, Dai fails to teach or suggest a set of data rings internal to the cross-bar switch to communicate the data packets from said set of input ports to said set of sink ports. The Dai system that utilizes switches capable of being connected to form an overall ring does not anticipate or suggest Applicants' claimed method that requires transferring data packets from a set of input ports of a switch to a set of data rings internal to the switch and in communication with a set of sink ports of that particular switch.

In order to support an anticipation rejection under 35 U.S.C. 102(e), it is well established that a prior art reference must disclose each and every element of a claim. This well known rule of law is commonly referred to as the "all-elements rule."[8] If a prior art reference fails to disclose any element of a claim, then rejection under 35 U.S.C. 102(e) is improper. [9]

Dai et al. fails to disclose each and every limitation set forth in amended claims 39-43 and 47-78. For at least these reasons, the Examiner has failed to establish a prima facie case for anticipation of Applicants' amended claims 39-43 and 47-78 under 35 U.S.C. 102(e). Withdrawal of this rejection is requested.

New Claims:

Applicants have added claims 79-80 to the pending application. The Dai reference fails to disclose or suggest the inventions defined by Applicants' new claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed inventions. As one example, Dai fails to teach or suggest a switch in which at least one of the sink ports is adapted to concurrently receive from the input ports a plurality of data packets having different

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[8] *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 USPQ 81 (CAFC 1986) ("it is axiomatic that for prior art to anticipate under 102 it has to meet every element of the claimed invention").
[9] *Id. See also Lewmar Marine, Inc. v. Barient, Inc.* 827 F.2d 744, 3 USPQ2d 1766 (CAFC 1987); *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (CAFC 1990); *C.R. Bard, Inc. v. MP Systems, Inc.*, 157 F.3d 1340, 48 USPQ2d 1225 (CAFC 1998); *Oney v. Ratliff*, 182 F.3d 893, 51 USPQ2d 1697 (CAFC 1999); *Apple Computer, Inc. v. Articulate Systems, Inc.*, 234 F.3d 14, 57 USPQ2d 1057 (CAFC 2000).

destination addresses, as required by claim 79. Further, Dai fails to teach or suggest a switch having a set of data rings internal to the switch to communicate the data packets from said set of input ports and said set of sink ports, as required by claim 80.

No new matter has been added by the new claims.

CONCLUSION

All claims in this application are in condition for allowance. Applicants respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date: July 15, 2005

By: Kent J. Sieffert

SHUMAKER & SIEFFERT, P.A.
8425 Seasons Parkway, Suite 105
St. Paul, Minnesota 55125
Telephone: 651.735.1100
Facsimile: 651.735.1102

Name: Kent J. Sieffert
Reg. No.: 41,312